



THE JANUS OF SCIENCE.

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"VIVISECTION AND ITS TWO-FACED ADVOCATES,"

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Vivisection
Pamphlet

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ERRATUM.



Page 5, line 12 & 13,

For LAUDER BRUNTON, &c.

read PROFESSOR GERALD YEO.

Fortnightly Review.

of the
Vivisection
Pamphlet

THE JANUS OF SCIENCE.

THE position in which we, the opponents of Vivisection, find ourselves at present is this :—

We seek to stop certain practices which appear to us to involve gross cruelty, and to be contrary to the spirit of English law. Our knowledge of them is derived almost exclusively from the published reports and treatises prepared and issued by the actual individuals who carry out those practices; and our arguments are grounded upon *verbatim* citations from those published reports and treatises.*

The persons whose practices we desire to stop, and their immediate associates, now meet our charges of cruelty by articles in the leading periodicals, wherein the proceedings in question are invested with a character not only diverse from, but opposite to, that which they wear in the scientific treatises and reports above-mentioned.

* *E.g.*, the "Handbook of the Physiological Laboratory," by Drs. Burdon-Sanderson, Lauder-Brunton, Klein, and Foster, London, 1873; Béclard's "Traité Elementaire," Paris, 1880; Claude Bernard's "Physiologie Opératoire," "Traité sur le Diabète," and "Sur la Chaleur Animale;" Cyon's "Methodik," Giessen; Paul Bert's "La Pression Barométrique," Paris, 1878; Mantegazza's "Del Dolore," Florence, 1880; Livon's "Manuel de Vivisections," 1882; *Archives de Physiologie*, edited by Brown-Séquard, Charcot, and Vulpian; Schiff's "Fisiologia Esperimentale," 1866; "Pharmacology and Therapeutics," by Dr. Lauder-Brunton, 1880; *Transactions of the Royal Society*, 1875; *Journal of Physiology*, Michael Foster, 1882; Goltz' "Verrichtungen des Grosshirns," 1881.

I shall, in this paper, endeavour to indicate the outlines of these diversities and contradictions, premising that, from the nature of the case, the argument is a cumulative one, of which the full force can only be felt by those who have actually perused the treatises and experienced the impression which they are calculated to produce. Afterwards, I shall deal with some subordinate matters respecting which my statements in a previous article (in the *Fortnightly Review*) have been called in question.

1. In the first place, the *purpose* of the great majority of experiments is differently described in the scientific treatises and in the popular articles. In the former, the *raison d'être* of most experiments appears to be the elucidation of points of purely scientific interest. It is only occasionally that we meet with allusions to diseases or their remedies, but the experiments are generally described as showing that one organ acts in one way and another in another; that such a lesion, or such an irritation, produces such and such results and reactions; and (especially) that Professor A.'s theory has been disproved and that of Professor B. (temporarily) established. In short, every page of these books corroborates the honest statement of Professor Hermann of Zurich: "The advancement of science, and not practical utility to medicine, is the true and straightforward object of all vivisection. No true investigator in his researches thinks of the practical utilization. Science can afford to despise this justification with which vivisection has been defended in England."—*Die Vivisectionsfrage*, p. 16.

We now turn to such articles as the six which have appeared in the *Nineteenth Century* and the two in the *Fortnightly Review* in defence of vivisection, and, *mirabile dictu!* not a solitary vivisection is mentioned of which the direct advancement of the Healing Art does not appear as the single-minded object.

2. Again, the *severity* of the experiments in common use,

appears from the Treatises and Reports (always including the English "Handbook," *Transactions*, and *Journal of Physiology*) to be truly frightful. Sawing across the backbone, dissecting out and irritating all the great nerves, driving catheters along the veins and arteries, inoculating with the most dreadful diseases, cutting out pieces of the intestine, baking, stewing, pouring boiling water into the stomach, freezing to death, reducing the brain to the condition of a "lately-hoed potato field;" these and similarly terrible experiments form the staple of some of them, and a significant feature in all.

But turning now to the popular articles, we find Dr. Lauder Brunton assuring the readers of the *Nineteenth Century* that "he has calculated that about twenty-four out of every 100 of the experiments (in the Parliamentary Returns), might have given pain. But of these twenty-four, four-fifths are like vaccination, the pain of which is of no great moment. In about one-seventh of the cases the animal only suffered from the healing of a wound." Sir James Paget afforded us a still more *couleur de rose* view of the subject. He said: "I believe that, with these few exceptions, there are no physiological experiments which are not matched or far surpassed in painfulness by common practices permitted or encouraged by the most humane persons."

3. Again, as regards the *feelings* of the vivisectors, in reading these terrible Treatises we do not meet with one solitary appeal against the repetition of painful experiments, one caution to the student to forbear from the extremity of torture, one expression of pity or regret—even when the keenest suffering had been inflicted. On the contrary, we find frequent repetitions of such phrases as "interesting experiments," "very interesting experiments," "beautiful" (*schöne*) cerebral inflammation, and so on. In short, the writers, frankly, seem pleased with their work, and exemplify Claude Bernard's description of the ideal Vivisector—the man

who "does not hear the animal's cries of pain, and is blind to the blood that flows, and who sees nothing but his idea and organisms which conceal from him the secrets he is resolved to discover."* Or still more advanced, they realized Cyon's yet stronger picture in his great book of the "Methodik," of which, by the way, he has lately told us in the *Gaulois*, that when the book was coming out his English colleagues implored him not to allow it to be advertised in England.

In this most important treatise M. Cyon tells us :—

"The true vivisector must approach a difficult vivisection with *joyful excitement*. . . . He who shrinks from cutting into a living animal, he who approaches a vivisection as a disagreeable necessity, may be able to repeat one or two vivisections, but he will never be an artist in vivisection. . . . The sensation of the physiologist when, from a gruesome wound, full of blood and mangled tissue, he draws forth some delicate nerve thread. . . . has much in common with that of a sculptor."—*Methodik*, p. 15.

This is the somewhat startling self-revelation of the Vivisector, made by himself to his colleagues. The picture of him in the *Nineteenth Century* and *Fortnightly Review* is almost as different as one face of Janus from the other. We find him talking of the power of "controlling one's emotions," "disregarding one's own feelings at the sight of suffering," "subordinating feeling to judgment," and much more in the same strain, whereby the Vivisector is made to appear a tender-hearted martyr to the Enthusiasm of Humanity.

4. Again, as to the *number* of animals dissected alive, the Treatises make us suppose it to be enormous. M. Paul Bert gives cases of terrible experiments on dogs placed under the compression of eight atmospheres and coming out stiffened, "so that the animal may be carried by one paw just as a

* "Introduction à l'Etude de la Médecine Experimentale," p. 180.

piece of wood"—and on cats which, when dissected after death, showed a "marrow which flowed like cream;" and of these experiments he gives the public instances up to No. 286. Schiff is calculated to have "used" 14,000 dogs and nearly 50,000 other animals during his ten years' work in Florence. Flourens told Blatin that Magendie had sacrificed 4,000 dogs to prove Bell's theory of the nerves, and 4,000 more to disprove the same; and that he, Flourens, had proved Bell was right by sacrificing some thousand more. Dr. Lauder-Brunton himself told the Royal Commission (Q. 5,721) that in one series, out of three on one subject, he had sacrificed (without result) ninety cats in an experiment during which they lingered four or five hours after the chloroform (Q. 5,724), with their intestines "operated upon." He also carried on another series of 150 experiments on various animals, very painful, and notoriously without results (Q. 5,748). This is the scale on which vivisections abroad and at home are carried on, if we are to be guided by the Treatises.

Turn we now to the popular Articles; and we find mention only of the very smallest numbers. Sir William Gull minimizes Bernard's stove-baked dogs to six (concerning the correction of which statement, see further, p. 13), and Professor Yeo brings down those of Professor Rutherford's victims to twelve (for which also see p. 21) every reference to numbers being apparently, like those of the Fuegians, limited to the digits of physiologists.

5. Again, as regards *Anæsthetics*, throughout the Treatises I cannot recall having once seen them mentioned as *means of allaying the sufferings of the animals*, but very often as convenient applications for *keeping them quiet*. Claude Bernard in his "Physiologie Opératoire," and Cyon in his great "Methodik," each devote a section to them as MEANS OF RESTRAINT ("contention"), and describe their merits from that point of view. Morphia, for example, Bernard recommends because it keeps

the animal still, though "*il souffre la douleur*;" and of curare (which, he says, causes "the most atrocious sufferings which the imagination can conceive"), he remarks, without an expression of regret, that its use in vivisection is so universal that it may always be assumed to have been used in experiments not otherwise described. Nor can haste explain this omission to treat anæsthetics from the humanitarian point of view, for the Treatises contain long chapters of advice to the neophyte in vivisection, how he may ingeniously avoid being bitten by the dogs, or scratched by the yet more "*terrible*" cats, which are, Bernard pathetically complains, "*indocile*" when lifted on the torture trough.

Turning to our *Nineteenth Century* essayists, we find chloroform is everywhere, and curare nowhere.

6. Lastly, there is not a trace in the Treatises—even in the English "Handbook"—of the supposed Wall of China which guards the Flowery Land of English Vivisection from the hordes of outer barbarians who practise in Paris, Leipsic, Florence, Strasbourg, and Vienna. We find, on the contrary, a frequent and cordial interchange of experiments and compliments. Our English vivisectionists study in the schools of the Continent, and in several cases have brought over foreigners to be their assistants at home. When Claude Bernard died, so little did English physiologists think of repudiating him, that a letter appeared in the *Times* of March 20, 1878, inviting subscriptions to raise a monument to his honour, signed by Sir James Paget, Dr. Burdon-Sanderson, Professor Humphry, Professor Gerald Yeo, Mr. Ernest Hart, Mr. Romanes, and Dr. Michael Foster. Even last autumn, when Professors Goltz, Flint, Brown-Séquard, Béclard, and Chauveau joined the International Congress in London, they were received with the warmest welcome from their English colleagues, one hundred of whom accompanied Professors Goltz and Ferrier to inspect the dogs of the former and the monkeys of the latter (I beg pardon, of Professor

Yeo); and when Professor Goltz returned to Germany, he published a volume containing beautiful coloured pictures of the mutilated brains of his dogs, and dedicated it—to whom does the reader think? To—

“HIS ENGLISH FRIENDS!”*

All this does not look exactly like hearty disgust and repudiation of the foreign system.

But turn we to the *Nineteenth Century* and *Fortnightly Review*, and lo! the garments of our English physiologists are drawn closely around them, and we are assured they have “no connection whatever with the establishment over the way.” I am even rebuked for placing on the same page (in my article “Four replies”) certain English experiments and “the disgusting details of foreign atrocities, which excite a persistent feeling of repugnance.” Professor Yeo says he “regards with pain and loathing such work as that of Mantegazza,” and asks me bitterly, “Why repeat the oft-told tale of horrors contained in the works of Claude Bernard, Paul Bert, Brown-Séquard, and Richet in France, of Goltz in Germany, Mantegazza in Italy, and Flint in America?” (p. 361.)

Surely this is a cargo of Jonahs thrown overboard together! Claude Bernard, the prince of physiologists, to whom this same professor Gerald Yeo, four years ago, wished to raise a statue! Brown-Séquard, the honoured of Professor Huxley! Professor Flint, who, six months since, was the favoured guest of every scientific throng in London, and who, I presume, is of Anglo-Saxon race, only corrupted from humane British vivisection by evil American communications! And lastly, Goltz!—poor Professor Goltz, who had so many cordial hand-shakes on quitting perfidious Albion, while the autumn leaves were falling, and who is now flung down the Gemonian stairs, a sacrifice to the rabble of anti-vivi-

* “Verrichtungen des Grosshirns,” 1881.

sectors even while the ink is scarcely dry on his touching dedication of his book:—

“SEINEN
FREUNDEN IN ENGLAND
GEWIDMET
VON DEM VERFASSER.”

May not this new Raleigh fitly cry, not, “O the friendship of Princes !” but “O the friendship of Physiologists?”

Thus we see that, as regards, first, the *purpose* of the majority of vivisections; second, their *severity*; third, their *number*; fourth, the *feelings* of the experimenters; fifth, the use of *anæsthetics*; sixth, the *difference* between English and foreign vivisection,—in short, on every one of the points of importance in the controversy,—there is contradiction on the broadest scale between the scientific Treatises and Reports prepared for “brethren of the craft” and the Articles written in lay periodicals for the edification of the British public.

It is for the reader to judge which class of statement may, with the greater probability, be held to represent the genuine doings and feelings of the writers.

I now proceed to examine some of the minor points whereon my statements in the *Fortnightly Review* for January have been attacked by the writers in the *Nineteenth Century* and *Fortnightly Review* for March.

Sir William Gull is, no doubt, a great authority on drugs and diseases.* Perhaps for that reason he has scarcely devoted much leisure to the study of morals and divinity. Had he done so he would scarcely have asked, “What casuist can doubt the moral duty (of pressing on the acquisition of

* Sir William Gull told the Royal Commission, however (Q. 5,545), when asked “As regards remedial drugs, are there many which you can enumerate as having been discovered by those processes? (vivisections),” “I am sorry to say that I am not a great believer in drugs.”

knowledge), with the parable of the Talents before him?" The casuist is, I think, yet to be found who will maintain that the pursuit of knowledge is not morally limited, like every other human pursuit, by the lawfulness of the means to be therein employed; and certainly our fashionable physician stands alone in an interpretation of the Gospel parable which would represent the Teacher as recommending the man with five talents to increase them—let us say, by knocking down and robbing the man with one. As Sir William Gull has, however, begun the study of the Bible, I may point out to him that in the opening chapters of Genesis he will find the ruin of the whole human race attributed to "the acquisition of knowledge" regardless of lawful limitation.

The experience of six years has convinced most of us that to argue a point of animal suffering with a vivisector is not a very hopeful proceeding. There is one matter, however, wherein, as he seems to refer to me, I shall try to convict Sir W. Gull. He ridicules my expression of "baking alive," applied to the dogs in Bernard's stove, and through a page and a half he labours to explain that the sufferings of Bernard's victims were only those of a man dying of fever. "The animal—or man," he says, "is under such circumstances (those of fever) baked alive"—and he leaves the impression that in his opinion the pain of the stove and the pain of the fever were equal. Here is what a physiologist of a different school wrote recently in the *Spectator*, respecting similar observations made by Mr. Edmund Gurney in the *Cornhill Magazine* :—

"In the baking experiments, of which Mr. Gurney states a great deal has been made, according to him 'the actual mode of death was not exceptionally painful,' in proof of which he states that 'the stages of death were faintness and exhaustion, passing on to coma, and, finally some convulsive movements.' Now, Mr. Gurney, being a layman, may be excused when, misguided perhaps by some friendly vivisector, he comes to

the incredible conclusion that death by baking is not exceptionally painful ; but he ought, at the very least, to have taken the opinion or description of the experimenter who performed the experiments, to whom full reference was given. As he has failed to do so, I shall supply the quotation in question from Claude Bernard, in ' *La Chaleur Animale*, ' Paris, 1876, page 356 :—' When the animal feels the toxic effects of the heat, it presents a series of symptoms which are constant and characteristic. At first, it is somewhat agitated ; soon respiration and circulation become accelerated ; the animal gasps, it pants, at last it falls into convulsions, and with a scream (*poussant un cri*), it generally dies suddenly.'

"Surely Mr. Gurney does not mean to quibble over the terms 'boiling alive' and 'baking alive.' As far as the experiments are concerned, where the animals were placed till they died in a little oven over a fire (of which a woodcut, reproduced by photography, of the original, in *loc. cit.*, page 347, generally accompanies the textual descriptions), no other term could possibly be applied than 'baking alive.'"—*Spectator*, Feb. 11, 1882.

In short, if for "stove" we substitute "oven," we shall be in a position to give an answer to the simple questions—
1. Is the pain of fever (such as many of us have endured for three weeks, and recovered afterwards) equivalent to the pain of being put into a machine at such a temperature as that we should die in a few minutes? 2. Ought a living rabbit inside such a machine to be described by a different word from a dead rabbit put into it and taken out after a few minutes longer, *fit to be eaten*?

I am content now to leave this point, which is a sample of the general treatment of our charges by the advocates of vivisection ; but before dismissing Sir W. Gull, I must express my amazement that he should have quitted the safe field of vague denial and suggestion, and committed himself to a matter of definite numbers, whereon his readers need only use their eyes

on a visit to the Victoria Street Society's Library, to see that he has made a statement—as an Italian would politely say, *pienamente inesatto*. Sir William says (pp. 460, 461), “Bernard, in these (stove) experiments, sacrificed two pigeons, two guinea pigs, less than twenty rabbits, and *six* dogs.” Where did he find this number “six?” I have before me Claude Bernard's own book, wherein the disputed experiments are detailed, and diagrams of the stoves inserted (pp. 347 *et seq.* to pp. 358, 359); two pages are occupied by a synoptical table of the experiments which were performed in the first and simplest stove or oven, with the diagram of which many of my readers are no doubt familiar. In this table I read in one column the word “*chien*” three times, then eleven times, and then twice. Only one of these dogs is said to have survived having been withdrawn, after thirty-six seconds only of the stove. Another, which was also withdrawn, died in four hours.

If Sir William Gull finds that $3 + 11 + 2$ amount to 6, I shall venture to offer him a copy of Colenso's Arithmetic, out of consideration for his patients, to whom his peculiar views of the First Rule might prove of importance in a prescription for physic.

Of the *second* stove or oven, of which Bernard gives a diagram in his next chapter, and in which another series of dogs and other animals were baked, Sir William Gull takes no notice at all. From his triumphant conclusion respecting the results of the martyrdom of the “six” dogs, the unwary reader might suppose that we had quite got to the bottom of the mystery of fever. To those who have lost their nearest and dearest by such disease, there must be something ineffably tantalising in these perpetual boastings—while we are all the time precisely where we were; and I confess to being, for my own part, just a little sick of these Hopes which (it has been remarked) “spring eternal in the physiological, as in the human, breast.” She is, I think, somewhat of an impostor

this "Hope" of Science—who leans not on an anchor, but against a vivisectioning trough, and whom her traditionary sisters, Faith and Charity, would certainly hasten to repudiate. The references to this Hope in every page of every defence of vivisection call to mind the story of Sir Boyle Roche in the Dublin Parliament, when he maintained that the Union with England had brought uncounted, but not easily defined, benefits to Ireland. "Honourable gentlemen," said Sir Boyle, with Hibernian eloquence, "may titter, *but when the Day of Judgment comes* they will see the good the Union has done to Ireland." Just so. And when the Day of Judgment comes—scarcely sooner—we shall look for the promised cure of fever and cholera, cancer and consumption by means of vivisection.

Sir William does not conclude without again parading his singular ignorance of the rudiments of ethics. Quite calmly he enounces the astounding canon: "Our obligations to the lower creatures *arise out of ourselves*. We owe it *to ourselves* that we should treat them with tenderness." The Catholic doctrine, that we owe it to God to be kind to His creatures, exhibits one side of the truth. The doctrine of the intuitionist Butler, and the utilitarian Bentham, that we owe to every sentient creature to spare it pain, simply because it is sentient, sets forth the larger truth. But the doctrine of Sir William Gull, that duty to the lower animals is exclusively a *personal* duty (like truth, temperance, and chastity), seems to reveal incomprehension of the very alphabet of morals. There is however just one thing which the great teachers of physical science deem beneath their notice. It is that science which deals with the noblest part of the noblest creature. The ganglion of a worm or the egg of a maggot is in their eyes more interesting than the heart of a poet or the conscience of a saint.

In the second essay in the *Nineteenth Century*, the writer,

Mr. Fleming, mentions with entire satisfaction (heightened by the usual condiment of Hope) various successful experiments of inoculation of rabies, tuberculosis, glanders (applied to a "worthless" horse), and of anthrax.

Into the interminable controversy respecting vaccination in all its forms, and the justice of the pæans over "cultivated virus" (delightful phrase!), which have been ringing in our ears this winter, it would be idle here to speak. I note that already there are signs of a return to a comparatively reasonable frame of the scientific mind, noticeable particularly in a report published in Dr. Lauder-Brunton's journal, the *Practitioner*, for March, of experiments made in Hungary in correction of those of Pasteur. The Commissioners sent by the Minister of Agriculture say that they "cannot overlook the fact that after the protective inoculations, *the deaths from other diseases*, or more correctly those in which the post-mortem appearances were those of catarrh, pneumonia, distoma, strongylus, and pericarditis, and not those of anthrax, occurred exclusively among the inoculated animals" (p. 233). They add that "there are still several doubts about the method from a public health point of view," and that "of great importance is the question whether the meat, milk, &c., of inoculated animals can convey anthrax." After referring to the inconceivable multiplication of disease germs in living and dead animals which would follow the extensive use of inoculation—germs which "might regain their original virulence, and in this roundabout way affect men and other animals"—the committee conclude that the "immediate general application of Pasteur's method in the form demonstrated to us here would be precipitate, that it should least of all be recommended by the State; and that . . . the performance of protective inoculation by private individuals should be completely forbidden. . . ." (p. 235).

The men of science will no doubt wrangle over this matter for some time to come. Meanwhile the lay public may

exercise its own humble common sense on a problem nearly connected therewith. Whither is Pasteurism to lead us? Vaccination as a protection from one special epidemic is a thing which the majority of us have, rightly or wrongly, accepted as a wise measure, though the anti-vaccinators have shown cause both to doubt the extent of its preservative power, and to credit it with certain "ghastly risks" more terrible than those from which it should shield us.

Accepting vaccination, however, as a preservative from one disease, how will it be when we and our cattle are to try twenty similar preservatives for twenty other diseases? Is it really to be believed that the order of things has been so perversely constituted as that the health of men and beasts is to be sought, *not* as we fondly believed by pure and sober living and cleanliness, but by the pollution of the very fountains of life with the confluent streams of a dozen filthy diseases? Mr. Fleming indites a psalm of triumph over the prospect of a boundless field of inoculations just opening to the activity of medical men and veterinary surgeons, who will go forth like so many sowers to scratch the people and cattle instead of the ground, and drop "cultivated virus" by way of seed or tares, as the case may prove. Are we then, our oxen, our sheep, our pigs, our fowls (that is to say, our own bodies and the food which nourishes them), all to be vaccinated, porcinated, equinated, caninized, felinized, and bovinated, once, twice, twenty times in our lives, or in a year? Are we to be converted into so many living nests for the comfortable incubation of disease germs? Is our meat to be saturated with "virus," our milk drawn from inoculated cows, our eggs laid by diseased hens—in short, are we to breakfast, dine and sup upon disease by way of securing the perfection of health?

Surely, when this last medical bubble has burst, it will be deemed the emptiest and the ugliest of the long series of which potable gold and the Elixir of Life formed the beginning.

The third article in the *Nineteenth Century* is by Dr. Lauder Brunton, one of the authors of the "Handbook." The gist of it consists in the attribution to vivisection of certain alleged advances in our knowledge of digitalis, strychnia, Calabar bean, pepsin, chloral, and nitrate of amyl. One would conjecture at first sight that, with all these new weapons wherewith to combat the Destroyer, the doctors would by this time have sensibly reduced the rates of mortality, and that at least four or five diseases should have been definitely conquered. A few figures to such effect from the Registrar-General's Report (which I fear somehow records quite an opposite state of things) would certainly be more satisfactory than to find all these new remedies paraded before us without any means of checking the boasted results. The unsatisfactory nature of these large statements may be noted even by one who, like myself, cannot pretend to get to the bottom of the matter—for example, in two instances out of Dr. Lauder Brunton's list :—

"The experiments of Luchsinger," Dr. Brunton says, "and of Rokitsansky prove"—so and so. "If then we should give strychnia at bedtime to the consumptive patient, we should prevent the sweats. We try it accordingly, and the result shows that the practical deductions from these apparently useless experiments on animals are correct, for the sweats cease and the prostration disappears" (p. 485).

This kind of thing addressed to the public who read the *Nineteenth Century* sounds delightfully clear and conclusive. But, by chance, I compare it with another report, written by Dr. Brunton for his scientific brethren, and reprinted from "St. Bartholomew's Hospital Reports," vol. xv. In this latter honest report there are cited only four cases wherein the beneficent effects of strychnia were tested. In Case 1 the patient died having had "no night-sweats until a few days before death." In Case 2 the remedy for the sweats caused the patient to think it increased her cough every time it was

administered. In Case 3 the remedy seems to have made little difference. In Case 4 it seems to have stopped the sweats, but we are not told whether the patient recovered. These results scarcely bear out, I think, the unlimited assertion in the *Nineteenth Century*, that on the application of the remedy "the sweats cease and the prostration disappears."

Again, Dr. Lauder Brunton tells us—as if the matter were beyond doubt:—

"The action of carbolic acid was first systematically investigated by Lemaire, and its application by Lister to surgery is one of the greatest boons to humanity of modern times. Of its importance in antiseptic surgery no one can be ignorant" (p. 485).

Who that reads the above in the *Nineteenth Century* would suppose that at the recent Congress one of the most eminent surgeons and vivisectors in Scotland, Dr. Keith, stated that he had abandoned the system of carbolic acid, because he found it to poison both himself and his patient? Another no less eminent English surgeon, Mr. Lawson Tait, wrote publicly two months ago of Mr. Lister's boasted ligature: "If the carbolic ligature had never been tried on animals, where it seems to answer admirably, it never would have been tried on human patients, where it fails miserably and has cost many lives?"—Letter to *Birmingham Daily Mail*, July 21, 1882.

I now reach the essay of Professor Yeo in the *Fortnightly Review*. It chiefly consists of contradictions of my statements in the January number of the same Review, together with some remarks on the noble article of the Lord Chief Justice, which had perhaps best be passed in silence.

Professor Yeo refers at great length to the annual Parliamentary Returns of Licenses and Certificates granted under the Vivisection Act, to prove the extreme paucity of painful experiments, and adds, "No one will, I think, presume

to say that this evidence is not absolutely unimpeachable and without prejudice.”—“No one?” Why, who in their senses takes the word of accused men for their own secret doings, and of what else do these returns consist? There is not even a pretence of real personal overlooking of the laboratories by the Inspector, much less of visits paid unawares. No doubt Mr. Busk has correctly noted the number of licenses actually granted by the Home Office—so far is a safe matter of official routine. But respecting the number of experiments performed under each license, and the degree of pain inflicted in such experiments, it is really crediting us with too much simplicity, “weak-minded humanitarians” though we be, to suppose we shall take the word of the very men whom the returns are intended to check. Did not Dr. Yeo indulge in a smile when he wrote the following:—“There are no signs of any attempt to keep back anything on the part of the experimenters; on the contrary, they seem to have been *rather too punctilious*?”

It is not easy to write on such a matter as Inspection under the Vivisection Act made by an Inspector who has been the elected Vice-President of that Royal Society to which all the leading vivisectors belong. But the following fable will perhaps convey the sense in which not a few of us regard the matter:—

FABLE.

“A Farmer once was much troubled by Mice in his Barn. So he went to the Lion and begged for a Cat. The Lion at first promised to send the Cat, but presently up came 3,000 Mice to the Lion’s Den, and squeaked so loud at the notion, that the Lion, who has a sneaking kindness for Mice, shook his mane, and winked at the Mice, and spoke thus: ‘I must give the Cat to Mr. Bull; but don’t be afraid! Pussy shall not eat you.’ So the Cat was turned into the Barn. It was a nice sleek Cat, who went purring up and down with a bell

round its neck, and never condescended to look down a Mouse-hole. Indeed, it had enough to do lapping its own cream without thinking of Mice. So whenever anybody asked how things were going on, the Cat said always ‘Purr,’ and never, ‘Mew, mew,’ and after a few years there were twice as many Mice in the Barn as when the Farmer asked for the Cat.”

Professor Yeo next quotes, as of great weight against anti-vivisectors, the resolution of the recent Congress in favour of vivisection. Considering that among the votes taken in favour of this resolution were no doubt his own and those of Professors Humphry, Rutherford, Ferrier, Bacelli, Hermann, Brown-Séguard, Charcot, Béclard, Chauveau, Virchow, Flint, and Goltz, it is almost quizzical to ask us to be impressed by their solemn approval of their own practice. A general meeting of the Dominican Order under the presidency of Torquemada would assuredly have passed equally unanimously a parallel resolution :—“That this assembly records its conviction that *Autos da Fé* have proved of the utmost service to religion in the past, and are indispensable to the immortal interests of the human race.”

Lastly, I come to the portion of Professor Yeo’s article which personally concerns me. I take up the glove he has thrown down, and call my readers to witness that I do so without the smallest hesitation.

Professor Yeo disputes three of the cases of English cruelty cited by me in the *Fortnightly Review* for January. He writes :—

“In the first the physiologist is quoted as saying : ‘As soon as the cat comes out of the chloroform, it lies in a helpless state, and does not move or give any signs of feeling.’ Commenting on this case, Miss Cobbe—quite ignoring the important word *chloroform*—suggests that the animal is paralyzed by the intensity of its agony.’ Can she really understand the matter so little as to imagine that an animal

suffers intense agony when it is completely stupefied by chloroform ? ”

Commenting on these remarks of Professor Yeo, I observe that he, quite ignoring the important words “*comes out of*” before “chloroform,” rebukes me for not understanding the cat to be “stupefied by chloroform” when the experimenter had expressly described it as having “*come out of the chloroform.*” What does “coming out of chloroform” mean, if not that the anæsthetic effects of the drug had ceased ?

2. Professor Yeo disputes my statements respecting Professor Rutherford’s experiments, which he says were “taken from an inaccurate account of the operations by Dr. Walker,” and are introduced by the statement that at least fifty dogs, under the express sanction of the law as it now stands, were used in the experiments. Professor Yeo goes on to say :—

“ We have seen by the official reports that no such number of animals suffered pain during the year in which Professor Rutherford made these experiments (1878). I happen to know that the exact number of animals used by Professor Rutherford under the certificate in question was twelve, and that they form three-fourths of all the experiments where the pain can be called appreciable that were done during that year.”

In my reference to Professor Rutherford’s experiments in the *Fortnightly Review*, I gave no date whatever, and I know not by what authority Professor Yeo pleases to fix on that of 1878. According to Dr. Rutherford’s own statement in the Scientific Reports of the *British Medical Journal*, May 5th, 1877, and December 14th, 1878, I find that altogether no less than sixty-seven dogs (as a minimum) were tortured. “Each experiment,” Professor Rutherford says, “lasted the entire day, at the close of which the animal was killed and the alimentary canal examined.” In the series for 1878, I find that thirty-one dogs were thus experimented on ; and I now ask Professor Yeo to be good enough to explain how the

“twelve dogs” which he “happens to know” was the “EXACT” number used by Professor Rutherford in 1878, managed between them to be killed *thirty-one times over*, and have their alimentary canals thirty-one times examined? Truly, these conflicting accounts of Professor Rutherford in a scientific Report, and of Professor Rutherford’s friend in the *Fortnightly Review*, are exceedingly puzzling to the lay intelligence; but perhaps Professor Yeo’s little mistake of twelve dogs for thirty-one still leaves his statement “accurate enough for scientific purposes?”

As to Professor Yeo’s reference to the Official Report, which states that “no such number of animals suffered pain during the year in which Professor Rutherford made these experiments,” I can only remark that, with Professor Rutherford’s own account of his dogs in our hands, we need no better evidence of the trustworthiness of those Official Reports on which half Professor Yeo’s paper is founded as “unimpeachable evidence.”

3. Finally, we arrive at Professor Yeo’s last challenge. He says (p. 361):—

“The third set of experiments adduced in proof of English cruelty is that performed by Dr. Roy on the innervation of the kidney, which was mentioned in the Physiological Section of the International Medical Congress. Of these experiments, Miss Cobbe admits she knows nothing, yet she suggest that they may prove a ghastly counterpart to some others, and she appeals in a telling manner to Dr. Roy’s hearers to tell us what those experiments were. I heard him on that occasion, and have also seen him operate, and I can assure your readers *that the infliction of pain had no part in the investigation*, for the animal was kept under chloroform all the time, and was killed before it recovered from the anæsthetic.” (p. 362.)

Here, then, we have something to definite to go upon. Professor Yeo says, he “*has seen*” Dr. Roy “operate,” and that the “infliction of pain had no part in the investigation.” It

would be too miserable a prevarication to offer this assurance concerning one experiment, if others of the same series involved frightful agony under curare alone. I therefore assume that Dr. Yeo has here pledged his honour that the infliction of pain had no part in any of these investigations of Dr. Roy described at the Congress, certainly not in the leading part of them. Now, what are the facts?

Dr. Roy has, I find, published an account of these experiments in two articles: first, on the Mechanism of the Renal Secretion, in the *Proceedings of the Cambridge Philosophical Society*, May 23rd, 1881; and second, on the Physiology and Pathology of the Spleen, in the *Journal of Physiology*, for January, 1882. In both these articles he states that the animal—rabbit, cat, or dog, in most cases the latter—was kept fully under the influence of ether, chloroform, or morphia, or a combination of two of these, from the commencement to the end of the experiment. These statements will be presently analyzed.

I now offer to the reader a summary of the contents of these papers, and a commentary upon them, drawn up by a gentleman perfectly qualified to deal with them scientifically:—

“Of the character of these experiments all foreign experimentors would acknowledge that, if they were not performed on animals fully under the influence of some anæsthetic or narcotic, the animals must have suffered atrocious agony, more severe, perhaps, than in any of the so much reprobated experiments performed by Mantegazza; for that experimentor trusted to the nails with which he larded his victims for causing irritation of any sensory nerves they might touch in their passage, while in Dr. Roy’s experiments the most sensitive nerves were first carefully dissected out, then tied, and the cut ends irritated by electricity. Now it so happens that the major portion of both series of experiments consisted in watching the effects of reflex action resulting from electrical

irritation of the cut ends of a large number of sensory nerves upon the blood-vessels or circulation in either organ. It is also certain that such reflex actions *could not be obtained from animals rendered insensible by anæsthetics or narcotics*. On this point the evidence of Dr. Brunton, himself an eminent vivisector, and joint author of the notorious 'Handbook,' as given before the Royal Commission (5745, 5811), is very explicit, and it is therefore clear from the results that the animals were made to suffer this, the most agonizing part of the experiments.

"The mutilations caused by dissecting out the various structures to be manipulated might fairly be described as something truly awful, as the detailed account presently to be given will demonstrate. Most of these mutilations could be performed even with advantage to the operator, under anæsthetics, as a means of keeping the animals quiet, but some could only be done well under curare and artificial respiration; for example, the dissecting out of the roots of the splanchnics on both sides of the thorax, where, but for artificial respiration, the lungs would collapse and the animal at once die of suffocation. And as a matter of fact, we are informed in both articles that curare and artificial respiration were used in the experiments to keep the dogs quiet; and if under this drug stimulation of the sensory nerves took place (and such a condition was, from an experimenter's point of view, the most appropriate), then the animals (to use Claude Bernard's classic expression) 'endured the most atrocious sufferings that the imagination of man can conceive.'

"As regards the first and, from the published details, the most severe of the two series of experiments, that on the kidneys, the use of curare and artificial respiration is referred to without any modifying circumstance or remark; and that there was great cruelty in that series we have upon authority that neither Dr. Roy nor Dr. Yeo would dare to impugn. In the account of the second series of experiments, on the

spleen, Dr. Roy speaks (207 and 221) sometimes of the curare being used, 'in addition to an anæsthetic agent,' during electric stimulation of nerves and of the medulla. Now, in the first place, we absolutely deny the possibility of keeping an animal insensible by anæsthetics during curarization; and in the second place, if it had been possible to do so, the operations now referred to are precisely those which could not be performed, that is to say, they would give no result if so performed; and this we shall prove also from the very clear evidence given before the Commission by Dr. Lauder Brunton, to whom we have already referred as an accomplished physiologist and part author of the 'Handbook.'

"Dr. Brunton's evidence refers specially to that very operation on the medulla, and to the whole class of electrical stimulation of the nerves which we are now considering; and as it is too valuable to be mutilated in any way, we give the evidence exactly as it stands in questions 5472-3-4-5.

" 'Mr. Forster asks, 5742: Then the purpose for which wourali (curare) is used is in order to keep the animal quiet, to make the experiment an easier one to conduct?—Yes, in frogs and in the higher animals it is to get rid of some of the effects which might be due to irritation of the nerve centres. For example, this is the case in some physiological experiments that have been made in Germany by irritation of various parts of the nervous system of the upper part of the spinal cord (*i.e.*, medulla). You want to ascertain the influence of that part upon the vascular system generally, the system of blood-vessels, and you want to ascertain that alone. If you irritate this upper part of the cord after you have given wourali, you only get the action upon the blood-vessels; but if you were to irritate this part without giving wourali previously, you would get the irritation conducted all down the ordinary motor nerves, and get all the muscles set into violent action; the action of the muscles would react upon the vessels, and you would get the whole experiment disturbed.

“ ‘ 5743. Is there anything to prevent your giving both drugs, or giving them mixed together, so as to stop the pain by the chloroform and the nervous movement by wourali?—YES, THERE IS, and it is this: in very many of these experiments you want to ascertain what is termed the reflex action; that is to say, that an impression is made upon a nerve, and goes up to the cord, and is transmitted down. Now, chloroform acts upon the reflex centres, and abolishes their influence completely; so that if you give the wourali, which paralyzes the ends of the motor nerves, and give chloroform, which paralyzes the reflex centres, you deprive yourself of the possibility, in many instances, of making satisfactory experiments.

“ ‘ 5744. But are there not many instances in which you give wourali simply for the purpose of getting the animal perfectly quiet?—Yes, those instances I have named.

“ ‘ 5745. But if it is done for the purpose of getting the animal perfectly quiet, could not chloroform be given also?—No, for that very reason; if you were to give chloroform, the experiment would be at an end; you would have abolished the action of the reflex centres, and thus you might as well not do the experiment at all.’

“ Now, with that exact and lucid explanation of Dr. Brunton before them, dare either Dr. Roy or Dr. Yeo pretend that an anæsthetic was used to make the animals insensible, either under curare or without it, while electrical excitation of those sensory nerves was being conducted, to obtain reflex reactions on the blood-vessels of kidney and spleen? And *not* being used, can they deny that during all these operations the poor mangled cats and dogs suffered atrocious agony?

“ There is still another insuperable difficulty in rendering curarized animals insensible by anæsthetics which may occur to many who are not physiologists. Most people are aware of the necessity of touching the cornea, or doing some similar action, while giving chloroform for a surgical operation, by way of

testing the presence of sensibility, through inducing some slight reflex action if sensibility persists. On the other hand, many persons know by this time of the great difficulty there has been in ascertaining whether or not sensitiveness persists during the motor paralysis produced by curare. Scientific opinion at the present day is almost unanimous in holding that curare leaves sensation and consciousness intact, but that is a question which has only been fully corroborated on human beings who have been operated upon under curare, and 'who remember all that has passed around them, and the sufferings they have experienced' (Bernard, in '*La Chaleur Animale*,' p. 63). As then the motor nerve to all muscles of expression are paralysed, what possible sign could be taken by Dr. Roy to mean that the animal was insensible? The thing is simply impossible, and this fact, coupled with the equal impossibility of getting any results from experiments of the kind we are considering, will probably lead most people to place another value upon Dr. Roy's statement about anæsthetics than that which he evidently desires.

"Let us now describe the mutilations and the character of the operations which took place in some or other of these experiments upon the kidney alone, probably in most of them; for, thanks to the secrecy guaranteed by the present Act, we cannot tell the number of animals sacrificed, and we are forced to take everything from the vivisector's own story:—

"First, the animal would be curarized and artificial respiration established. Then the kidneys on both sides would be arrived at by means of an incision through the loins; they would then be dissected clear of all their surroundings, often with 'the most laborious and minute cleaning of the walls of the artery and vein;' they would then be enclosed in a peculiarly shaped box, whose interior communicated with a clockwork registering instrument (plethysmograph and Ludwig's kymograph).

“ Again, the back of the skull would be cut away, and the little brain (*cerebellum*) lifted up to allow the medulla oblongata to be excited by weak induced currents of electricity. Incisions would be also made along each side of the windpipe, and the carotid arteries dissected out and closed at times by applying a clamp. The same instrument would be also applied to the innominate artery, to the renal arteries, to the large branches of the aorta in the abdomen, and to the abdominal aorta itself, below the point where the arteries to the kidneys are given off.

“ The chest and abdomen would be opened along their whole length and a glass tube tied in the pipes (ureters) which carry the urine from the kidneys to the bladder.

“ The spinal canal would be opened in the region of the neck by cutting through the backbone, and the roots of the whole of the nerves leading to the anterior limbs (brachial plexus of nerves) dissected out.

“ The roots of the splanchnics in the thorax and these nerves in their course through the diaphragm would also be dissected out. To do this the anterior surface of the backbone in the chest and belly would have to be cleared on both sides, and the contained organs moved from side to side as required.

“ The nerves leading to each kidney (from seven to eleven in number) had also to be dissected out.

“ The great nerves of the hip and leg (sciatic nerves) had also to be reached, and also the vagus, the great nerve which supplies all the organs in the chest and abdomen.

“ All the nerves mentioned were tied in two places and cut, the tying being for the purpose of lifting up either cut end (central or peripheral end) in order to excite it by electricity. Now tying a nerve, even although no bigger than a thread, causes extreme agony (Evidence Minutes, 4230), and in these poor animals all the principal sensory nerves in the body were so tied. Then the central and peripheral cut ends of these

nerves were stimulated with electricity from time to time, to see what might chance to happen to the circulation in the kidneys.

“ Sometimes the artificial respiration was stopped for three or four minutes to see what would happen to the same circulation during suffocation.

“ Various solutions of chemicals and drugs—nitrate of soda, urea, acetate of potash, digitalis, and common salt, also defibrinated blood, and serum from other dogs, were injected into the veins, to see what effect these would have on the kidney secretion.

“ And what were the results of this horrible series of experiments? Every time a nerve was excited and a pang of agony shot through the animal's frame there was only one result (except when the nerves to the kidney were cut, and therefore telegraphic communication broken) which happened invariably—the kidney contracted.

“ Another page might be filled with such details, and we have not even yet reached the experiments on the spleen.”

Here then is my answer to Professor Yeo's assertion, as an eye-witness, that “ the infliction of pain *had no part in Dr. Roy's investigation.*”

And here is also my answer to the charge of having misrepresented British physiologists by comparing them to foreign vivisectors. Dr. Roy, it is stated, is a young Scotchman, trained in Edinburgh. He obtained, through the recommendation of Professor Burdon-Sanderson, the office of Professor Superintendent of the Brown Institute, and, through that of Dr. Michael Foster, the George Henry Lewes Scholarship founded by the late George Eliot. It was doubtless by the help of the latter that he visited the continental laboratories, and in one of them performed some of his experiments in concert with Professor Cohnheim. The remainder of the series, as well as the whole series of experiments on

the spleen, were performed in the Physiological Laboratory of Cambridge.

Thus the attempt of the advocates of vivisection to distinguish modern English vivisection from the vivisection practised by foreigners in Germany, Italy, and France, once for all falls to the ground. These experiments of Dr. Roy—among the most agonising in the records of vivisection—took place neither far off nor long ago, nor yet were they the work of any foreigner. They were done by our own countrymen, within the last two years; and the greater part of them on English ground. Nay (most significant fact of all), the report of them was publicly read in the Physiological Section of the London Congress of 1881, and not one voice among all the English physiologists present was raised to express disapproval or rebuke.

FRANCES POWER COBBE.

ON THE VIVISECTORS.

In that day of awful wailing
 Human destinies unavailing,
 When man rising, stands before Thee,
Spare not these culprits, God of glory.

THE GENIUS OF PITY STAYING THE VIVISECTOR'S HAND.

(After the recent symbolic painting, by Gabriel Max, Germany.)

"The Genius of Pity stands besides a Physiologist, holding in her hand a pair of scales. In one scale is a human brain, surrounded with laurels; in another, a glowing heart. The scale containing the heart, far outweighs the scale containing the brain. The right arm of the Genius is thrown round a bound and bleeding dog."

Behold the heavier scale, wherein Man's heart

Doth far out-weigh his blood-enlaurelled brain,

Whilst, close beside, yon pitying Genius stands,

To stay the hand deep-skilled in craft of Pain !

E'en could ye point—men of remorseless soul,

To lessered pangs among the human kind,

Still might we question of the *final* gain

From hearts grown ruthless as the wintry wind !

But when, from all your myriad victims slain,

By torments direr than the mind may know,

Ye cannot point to *one* exalted truth,

To set against whole hecatombs of woe,

Men in whose breast one spark of pity glows,

Should wrest the scalpel from your tyrant hand,

To shield Man's faithful, but defenceless friends,

From miscalled Science, and her wolfish band !

—*Elliott Preston.*
